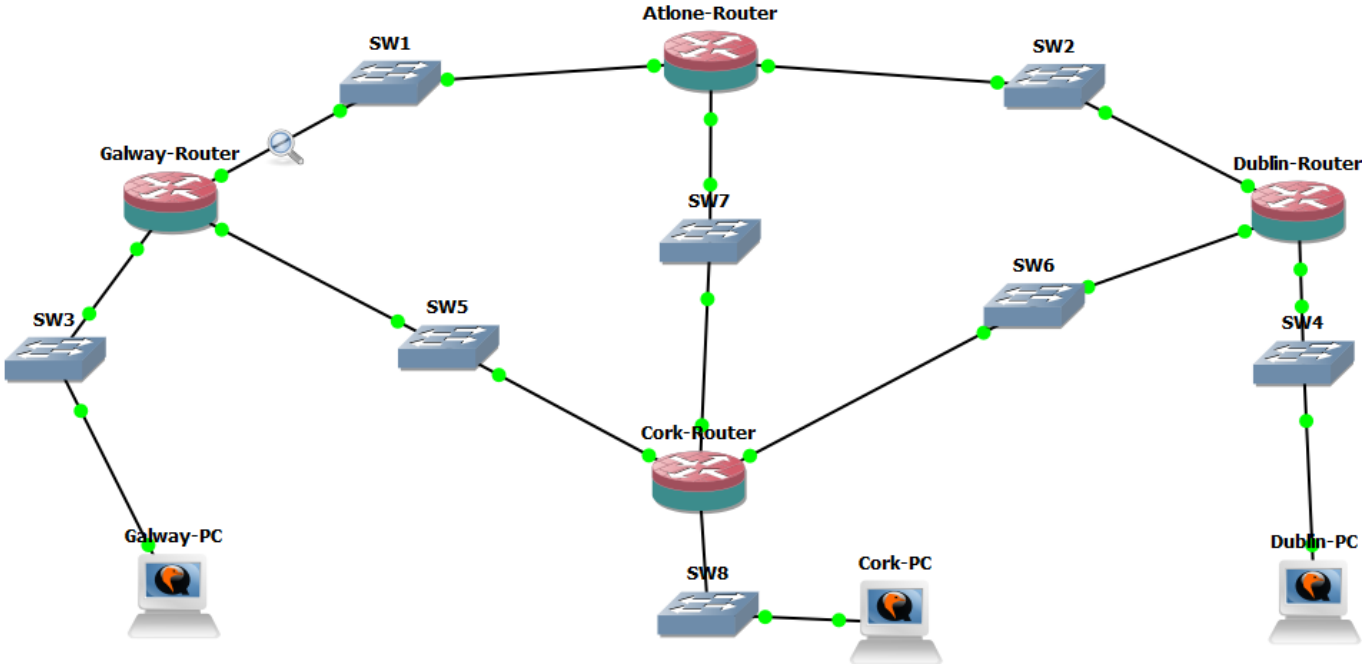
# Seán Reilly

14336256

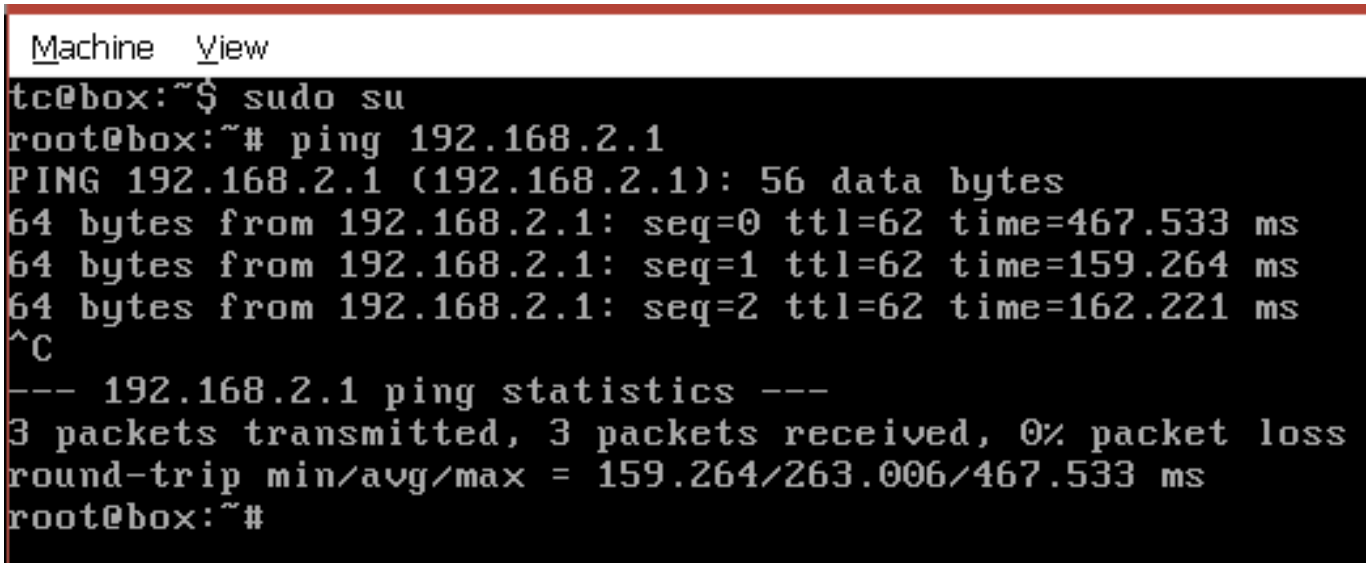
13/11/2016

**CT3531 OSPF Network Simulation Assignment**

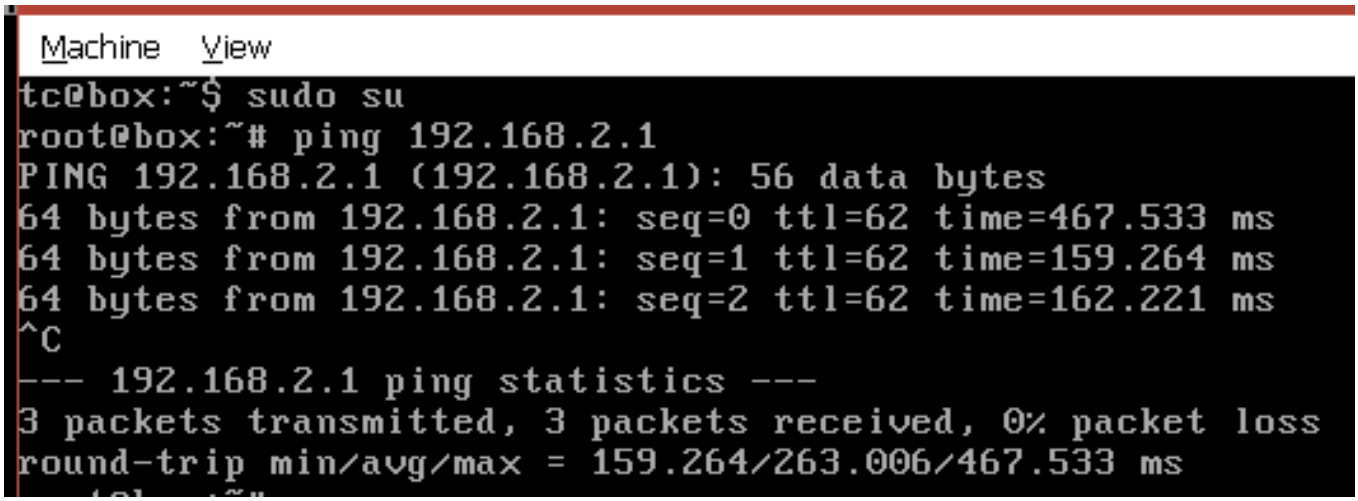


# 1. Ping & Traceroute

Galway -> Dublin (ping)

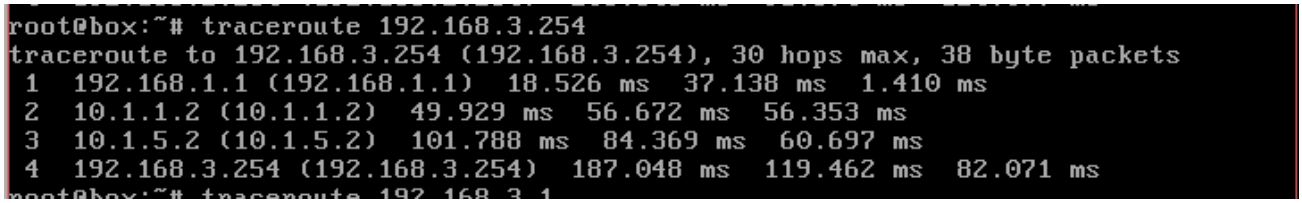



Galway -> Cork (ping)



## Traceroute:

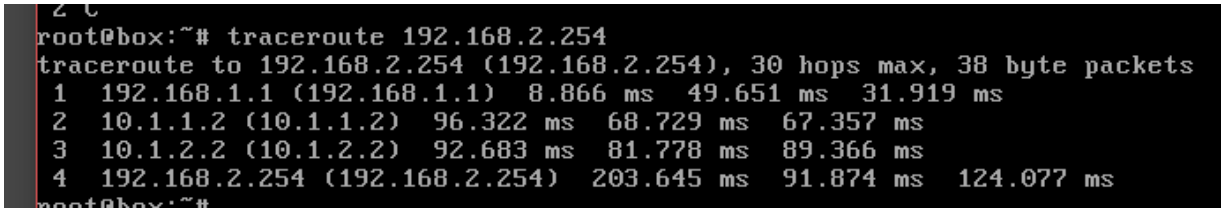
Galway -> Cork




- We start on the Galway PC (192.168.1.1).
- Then go to Athlone Router @ IP 10.1.1.2.
- Then it goes Cork Router @ IP 10.1.5.2.
- And finally we get to the Cork PC @ IP 192.168.3.254.

  This route is chosen as it is the route with the lowest OSPF cost.
  The link from the Galway Router to the Cork Router is 300 over the chosen connections which all had a cost of 10.

Galway -> Dublin



2. Turnoff Athlone

```
root@box:~# ping 192.168.2.254
PING 192.168.2.254 (192.168.2.254): 56 data bytes
64 bytes from 192.168.2.254: seq=0 ttl=61 time=116.411 ms
64 bytes from 192.168.2.254: seq=1 ttl=61 time=88.948 ms
64 bytes from 192.168.2.254: seq=2 ttl=61 time=106.747 ms
64 bytes from 192.168.2.254: seq=3 ttl=61 time=90.921 ms
64 bytes from 192.168.2.254: seq=4 ttl=61 time=118.619 ms
64 bytes from 192.168.2.254: seq=5 ttl=61 time=136.531 ms
```

```
root@box:~# ping 192.168.2.254
PING 192.168.2.254 (192.168.2.254): 56 data bytes
64 bytes from 192.168.2.254: seq=0 ttl=61 time=116.411 ms
64 bytes from 192.168.2.254: seq=1 ttl=61 time=88.948 ms
64 bytes from 192.168.2.254: seq=2 ttl=61 time=106.747 ms
64 bytes from 192.168.2.254: seq=3 ttl=61 time=90.921 ms
64 bytes from 192.168.2.254: seq=4 ttl=61 time=118.619 ms
64 bytes from 192.168.2.254: seq=5 ttl=61 time=136.531 ms
64 bytes from 192.168.2.254: seq=6 ttl=61 time=143.411 ms
64 bytes from 192.168.2.254: seq=7 ttl=61 time=123.311 ms
64 bytes from 192.168.2.254: seq=42 ttl=61 time=97.926 ms
```

First test: 38s, 34 packets lost.

```
PING 192.168.2.254 (192.168.2.254): 56 data bytes
64 bytes from 192.168.2.254: seq=0 ttl=61 time=81.988 ms
64 bytes from 192.168.2.254: seq=1 ttl=61 time=108.899 ms
64 bytes from 192.168.2.254: seq=2 ttl=61 time=115.193 ms
64 bytes from 192.168.2.254: seq=3 ttl=61 time=94.708 ms
64 bytes from 192.168.2.254: seq=4 ttl=61 time=110.696 ms
```

```
root@box:~# ping 192.168.2.254
PING 192.168.2.254 (192.168.2.254): 56 data bytes
64 bytes from 192.168.2.254: seq=0 ttl=61 time=81.988 ms
64 bytes from 192.168.2.254: seq=1 ttl=61 time=108.899 ms
64 bytes from 192.168.2.254: seq=2 ttl=61 time=115.193 ms
64 bytes from 192.168.2.254: seq=3 ttl=61 time=94.708 ms
64 bytes from 192.168.2.254: seq=4 ttl=61 time=110.696 ms
64 bytes from 192.168.2.254: seq=39 ttl=61 time=139.700 ms
64 bytes from 192.168.2.254: seq=40 ttl=61 time=108.771 ms
64 bytes from 192.168.2.254: seq=41 ttl=61 time=135.178 ms
```

Second test: 33s, 34 packets lost.

-

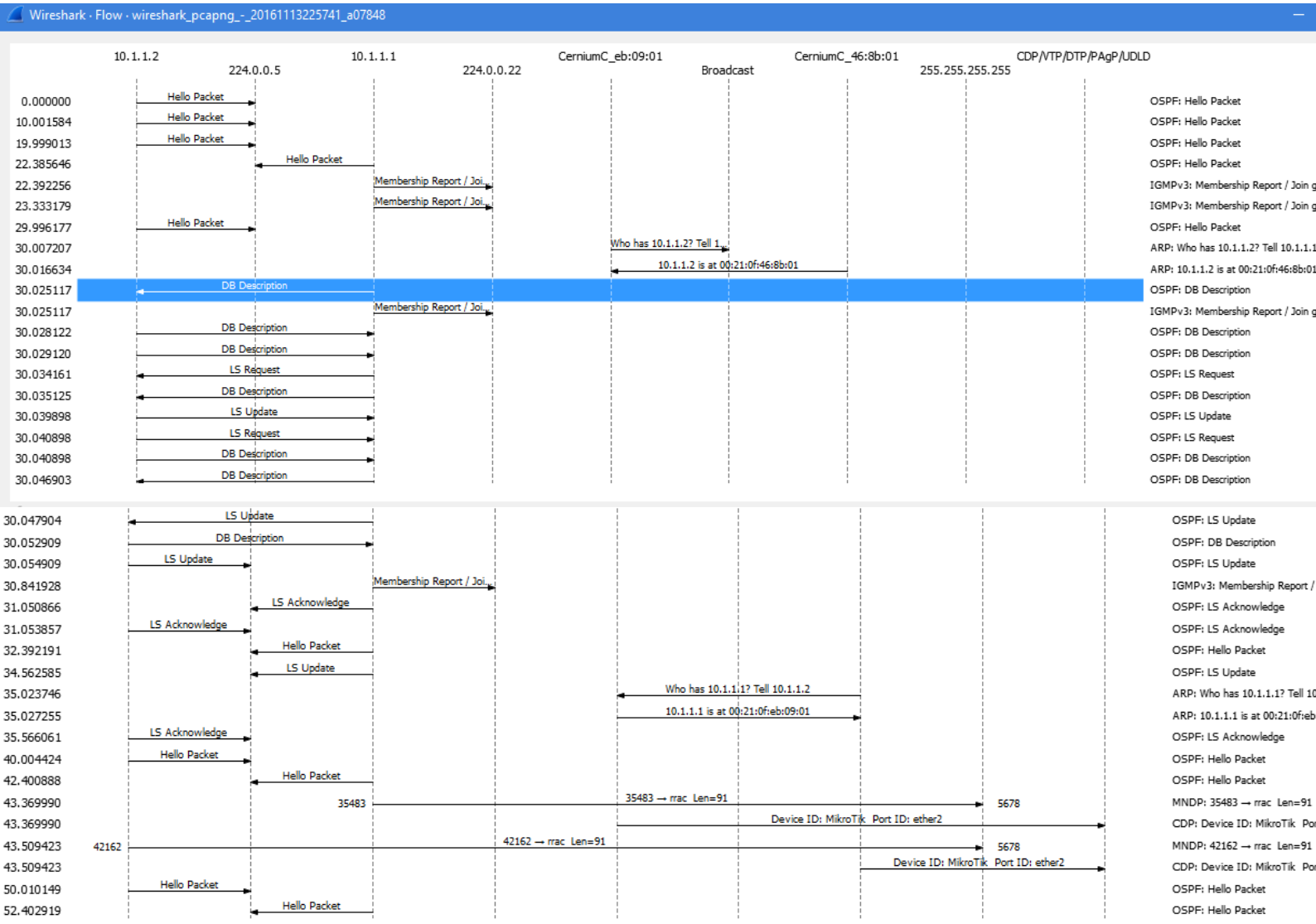
```
PING 192.168.2.254 (192.168.2.254): 56 data bytes
64 bytes from 192.168.2.254: seq=0 ttl=61 time=95.617 ms
64 bytes from 192.168.2.254: seq=1 ttl=61 time=94.379 ms
64 bytes from 192.168.2.254: seq=2 ttl=61 time=117.754 ms
64 bytes from 192.168.2.254: seq=3 ttl=61 time=139.200 ms
64 bytes from 192.168.2.254: seq=4 ttl=61 time=123.677 ms
64 bytes from 192.168.2.254: seq=5 ttl=61 time=148.132 ms
64 bytes from 192.168.2.254: seq=6 ttl=61 time=106.268 ms
```

```
root@box:~# ping 192.168.2.254
PING 192.168.2.254 (192.168.2.254): 56 data bytes
64 bytes from 192.168.2.254: seq=0 ttl=61 time=95.617 ms
64 bytes from 192.168.2.254: seq=1 ttl=61 time=94.379 ms
64 bytes from 192.168.2.254: seq=2 ttl=61 time=117.754 ms
64 bytes from 192.168.2.254: seq=3 ttl=61 time=139.200 ms
64 bytes from 192.168.2.254: seq=4 ttl=61 time=123.677 ms
64 bytes from 192.168.2.254: seq=5 ttl=61 time=148.132 ms
64 bytes from 192.168.2.254: seq=6 ttl=61 time=106.268 ms
64 bytes from 192.168.2.254: seq=43 ttl=61 time=143.160 ms
64 bytes from 192.168.2.254: seq=44 ttl=61 time=111.690 ms
```

Third test: 34s, 36 packets lost.

There was an average of 35 packets lost over around a 35 second time period.

3.




| No. | Time | Source | Destination | Protocol | Length | Info |
|---|---|---|---|---|---|---|
| 1 | 0.000000 | 10.1.1.2 | 224.0.0.5 | OSPF | 82 | Hello Packet |

- Hello messages are going from Galway's address and Athlone's address to the router's OSPF multicast address (224.0.0.5). Hello messages are a form of greeting, they allow routers to discover adjacent router on the local links and networks.

```
18 30.050686  10.1.1.1   10.1.1.2   OSPF      66 DB Description
20 30.086748  10.1.1.2   10.1.1.1   OSPF      66 DB Description
21 30.087725  10.1.1.2   10.1.1.1   OSPF     286 DB Description
22 30.107744  10.1.1.1   10.1.1.2   OSPF     286 DB Description
23 30.121740  10.1.1.2   10.1.1.1   OSPF      66 DB Description
```

- Database Descriptions are sent from both the Galway address and Athlone address to the other.
- DB Description message contain a description of the system. This will describe the topology of the network so OSPF can be enable.
- Multiple DB Descriptions are being sent here. Communicating larger DB Description requires breaking down the message with the receiver sending acknowledgments.

```
10.1.1.1   10.1.1.2   OSPF      70 LS Request
```

- An LS Request is sent from the Galway IP to the Athlone IP.
- LS Request are used to request updated information about a portion of the LSDB from another router.

```
30.414700  10.1.1.2   224.0.0.5  OSPF     154 LS Update
31.438659  10.1.1.1   224.0.0.5  OSPF      98 LS Acknowledge
31.877243  10.1.1.1   224.0.0.5  OSPF     110 LS Update
32.910122  10.1.1.2   224.0.0.5  OSPF      78 LS Acknowledge
```

- Updates and Acknowledgments are sent from each address (10.1.1.1 & 10.1.1.2) to the multicast address 224.0.0.5 on the router. OSPF has been fully established.
- The update messages contain updated information about the state of certain links on the LSDB.
- Acknowledgements are a crucial partial of updating the LSDB, and provide reliability to the link-exchange process.

```
40.634366  10.1.1.1   224.0.0.5  OSPF      82 Hello Packet
50.003957  10.1.1.2   224.0.0.5  OSPF      82 Hello Packet
50.631198  10.1.1.1   224.0.0.5  OSPF      82 Hello Packet
```

- Hello messages are then sent from each address periodically to check any changes in the network.